

RESPONSE TO OFFICE ACTION

A. Status of the Claims

Claims 1-50 are pending. Claims 2-35 and 46-50 were examined in the July 30, 2007 Office Action. Claims 1 and 36-45 were withdrawn as drawn to a nonelected invention. Claims 2-35 and 46-50 were rejected in the July 30, 2007 Office Action. With this Amendment and Response, claim 1 is newly canceled, and claims 2-4, 7, 12, 14, 19 and 21 are amended, to more particularly point out and distinctly claim the invention. The cancellation and amendments are made without prejudice or disclaimer.

B. Rejection under 35 U.S.C. 102(b)

Claim 2 was rejected under 35 U.S.C. 102(b) as being anticipated by Wisman *et al.*, *PNAS* 95:12432-12437 (1998). It is asserted that Wisman teaches a *tt6* mutant in *Arabidopsis* that comprises a mutant flavanone 3-hydroxylase that has lost its enzymatic function, allowing accumulation of naringenin, which is the substrate of isoflavone synthase. Applicants respectfully request reconsideration and withdrawal of this rejection in light of the claim amendments and the following comments.

Applicants note that claim 2 now depends from claim 4. As such, claim 2 now requires the up-regulation of an isoflavone synthase by introducing a transgene encoding the isoflavone synthase into the plant. Wisman does not disclose the introduction of a transgene encoding an isoflavone synthase into a plant. Since Wisman does not teach every element of rejected claim 2, it does not anticipate that claim. Accordingly, withdrawal of the rejection of claim 2 under 35 U.S.C. 102(b)

B. Rejections under 35 U.S.C. 103(a)

Claims 2-35 and 46-50 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 7,189,895 to McGonigle and Odell ("the '895 patent"), in view of U.S. Patent 7,098,011

to Fader et al. (“the ‘011 patent”), and in further view of Applicants’ asserted disclosure of the state of the prior art. It is stated that the ‘895 patent teaches down-regulating flavanone 3-hydroxylase and up-regulating expression of isoflavone synthase and chalcone isomerase by transformation with maize C1 and R transcription factors in conjunction with an antisense flavanone 3-hydroxylase, along with plants transformed thereby, and that the C1 and R transcription factors upregulate expression of chalcone synthase and chalcone isomerase as well as the expression of other enzymes of the phenylpropanoid pathway in plants, as further discussed in the ‘011 patent. Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) in light of the Declaration under 37 C.F.R. 1.131 and Exhibit A submitted herewith and the following discussion.

A Declaration under 37 C.F.R. 1.131 is provided herewith, along with supporting materials provided in Exhibit A. The dates on the Exhibit A attached to the Declaration have been redacted consistent with standard practice under 37 CFR §1.131, but each of the redacted dates is prior to June 13, 2002 and therefore the evidence provided reflects an invention date prior to that time, as explained in the Declaration. *See* MPEP §715.07. The Declaration and supporting materials establish that the claimed invention was conceived and reduced to practice prior to the June 13, 2002 priority date of the ‘895 patent. As the present invention was made before the ‘895 priority date, Applicants submit that the ‘895 patent cannot be used as prior art against the instant claims under 35 U.S.C. 103(a).

Since the ‘895 patent is not available as prior art for the rejection under 35 U.S.C. 103(a), in order for the rejections to be maintained, the remaining references, i.e., the ‘011 patent and Applicants’ asserted disclosure of the prior art, must combine to disclose all aspects of the rejected claims. In that regard, neither the ‘011 patent nor the Applicants’ disclosure of the prior art teaches or suggests the down-regulation of flavanone 3-hydroxylase to increase isoflavanoid biosynthesis in a plant, as required in rejected claims 2-35. Nor does the ‘011 patent or the Applicants’ disclosure

of the prior art teach or suggest any methods of increasing isoflavanoid biosynthesis in an alfalfa plant, as required in rejected claims 46-50. Since neither the '011 patent or the Applicants' asserted disclosure of the prior art teaches or suggests all aspects of the rejected claims, withdrawal of the rejections under 35 U.S.C. 103(a) is respectfully requested.

CONCLUSION

In light of the above amendments and discussion, applicants respectfully request withdrawal of all rejections and examination of withdrawn claims 37-45, since those claims are dependent on allowable claim 24 or 40.

Respectfully submitted,

/Robert E. Hanson/

Robert E. Hanson
Reg. No. 42,628
Attorney for Applicants

Sonnenschein Nath & Rosenthal LLP
1717 Main Street, Suite 3400
Dallas, TX 75201
Tel.: 214.259.0931
Fax: 214.259.0910

Date: January 30, 2008

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Richard A. Dixon *et al.*

Group Art Unit: 1638

Serial No.: 10/659,755

Examiner: Russell Kallis Ph.D.

Filed: September 10, 2003

Atty. Dkt. No.: 11000025-0045 NBLE:007US

For: METHODS AND COMPOSITIONS FOR
PRODUCTION OF FLAVONOID AND
ISOFLAVONOID NUTRACEUTICALS

Confirmation No. 4103

DECLARATION UNDER 37 C.F.R. § 1.131

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

1. We, Richard A. Dixon, Chang-Jun Liu and Bettina Deavours hereby declare as follows:
2. We are the co-inventors of the subject matter claimed in the above-referenced patent application.
3. We understand that the United States Patent and Trademark Office has rejected the claims of the above-referenced patent application as being obvious over U.S. Patent No. 7,189,895 in view of U.S. Patent 7,098,011.
4. We are submitting this Declaration to provide evidence demonstrating that the subject matter of the claims of the above-referenced patent application was conceived of and reduced to practice prior to the June 13, 2002 effective date of U.S. Patent No. 7,189,895.
5. As evidence of the foregoing, we attach as Exhibit A copies of laboratory notebook pages showing invention of the subject matter of claim 4 and claim 46, to which we understand the remaining rejected claims depend, prior to the June 13, 2002. Specifically, the attached exhibit shows that a plant was created expressing isoflavone synthase (IFS) in a flavanone 3-hydroxylase (F3H) knockout background (tt6 mutant) and the identification of a resulting increase in production of genistein prior to June 13, 2002. Therefore, we had invented the

subject matter of the claims rejected as obvious by the examiner prior to the effective date of U.S. Patent No. 7,189,895.

6. We declare that all statements made herein are true, and that all statements made upon information and belief are believed to be true, and further, that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and that willful, false statements may jeopardize the validity of the application, or any patent issuing thereon.

1/30/08
Date

Richard A. Dixon
Richard A. Dixon

Date

Chang-Jun Liu

Date

Bettina Deavours

③ Jan. 7. 2008 3:51PM PLANT BIOLOGY (SCOTTI) No. 0177 P. 4 02

Name:

Date:

Experiment:

(3) Sterile of seeds of 9-2-1/855#1 9-2-1/855#5 9-8-1/855#1 9-8-1/855#5

9-8-1/855#1/9-2-1 Selected in M₁ (K₂)

< be prepared for selection of 10/10/10, 11/11/11, by spraying >

4-19. move those plates into 24°C greenhouse from 4°C.



plasmids of AtCHS, AtCHI, F3'H, DFR in
TA vector were digested with EcoRI

AtCHS 1. 2

AtCHI 4

OK

F3'H #8

DFR #11

the probe may contain EcoRI site.

Choose #1, 2, 4, 7, 8, 10, 11

extract the phenylpropanoids from Cassia root (first stained then to supp

again: Control 0 hr 0.1 g Resupplied 0 hr 0.5 g
CH 20h 0.5 g 20h 0.5 g
CH 50h 0.5 g 50h 0.5 g

first with red acetone. Sonicate for 1 min then overnight at 4°C

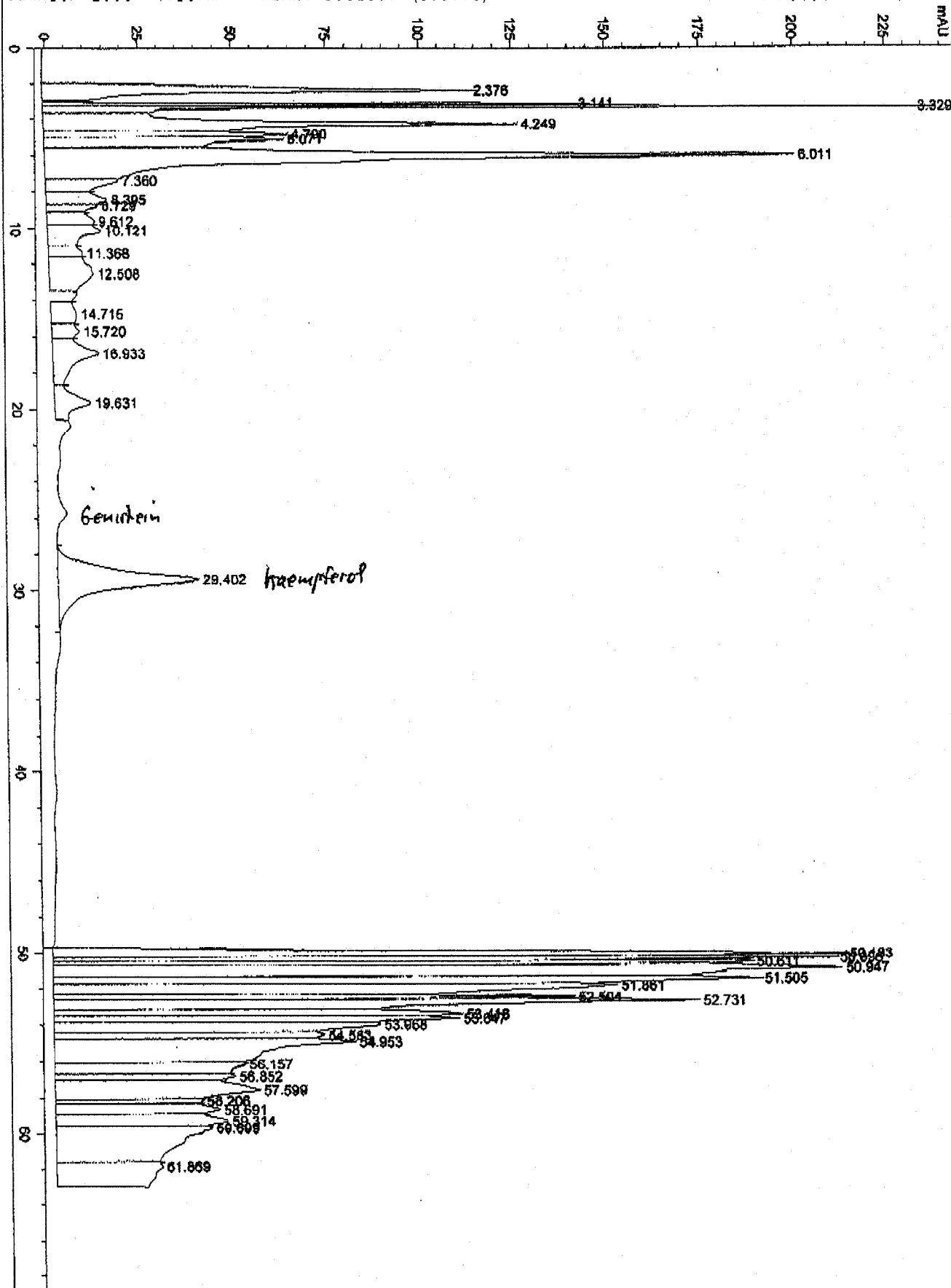
Second with acetone: methanol for 2 hrs

dry down

dissolved in 250 µl methanol (telle 2001) shot 3001

4-15. harvesting the seeds of 501 504

114



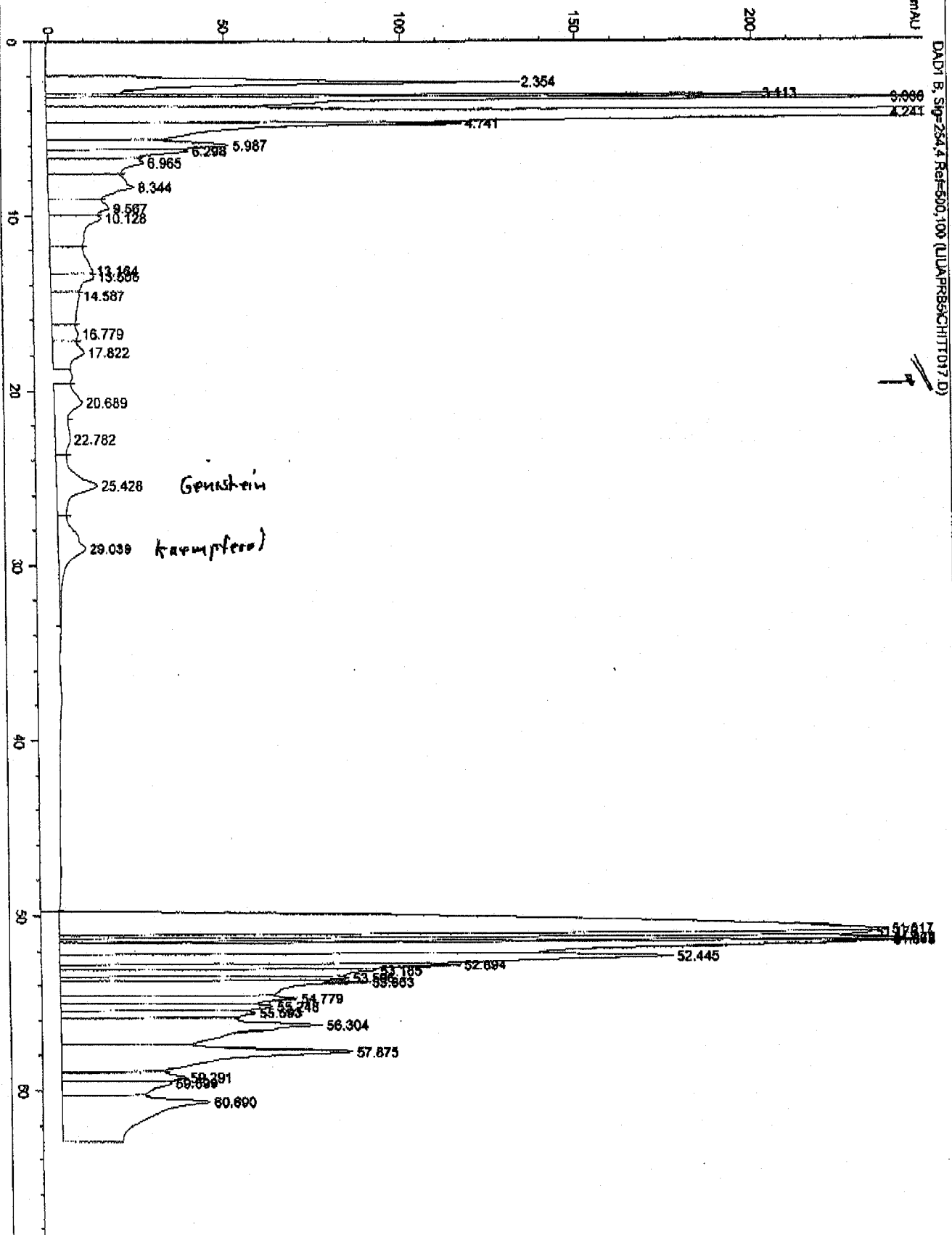
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Jan. 30. 2008 4:38PM

PLANT BIOLOGY (SCOTTI)

No. 0184 P. 5



PAGE 15/15 * RCVD AT 1/7/2008 3:53:07 PM [Central Standard Time] * SVR:GMTPRF01/22 * DNS:4777 * CSID:580 224 4758 * DURATION (mm:ss):04-1830 2 of 13

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Chy
01-28-08

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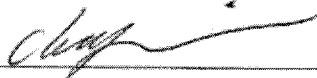
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Date

01-29-2008

Date

Richard A. Dixon



Chang-Jun Liu

Date

Bettina Deavours

③

Jan. 7, 2008 3:51PM

PLANT BIOLOGY (SCOTTI)

No. 0177 P. 4 02

Name:

Date:

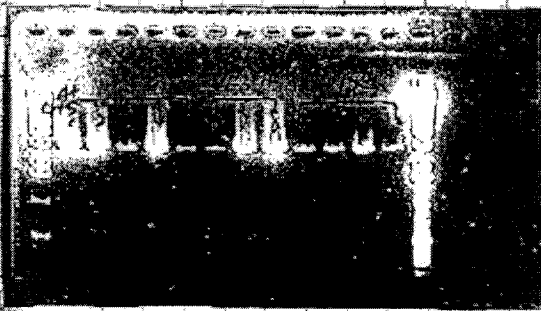
Experiment:

13. sterile of seeds of 9-2-1/8551 #1 9-2-1/8551 #5 9-8-1/8551 #1 9-8-1/8551 #5

8551 #1/9-2-1 Selected in 14% (K⁺)

< be prepared for selection of 1cc/100, 1+6+3/100, by spraying >

4-9. move these plates into 24°C greenhouse from 4°C



plasmid of ATCHS. ATCHI. F34. DPR in
TA vector were digested with EcoRI

ATCHS V. 2

ATCHI V

OK

F34 #8

DPR #11

this probe may contain EcoRI site.

Choose #1, 2, 4, 7, 8, 10, 11

extract the phenylpropanoids from Cassia's root (first started then resuppl)

again:	Control	0 hr	0.5 g	Resupplied	0 hr	0.5 g
	CHI	24h	0.5 g		24h	0.5 g
	CHI	54h	0.5 g		54h	0.5 g

first with ice acetone. Sonicate for 1 min then overnight at 4°C

Second with acetone: methanol. for 2 hrs

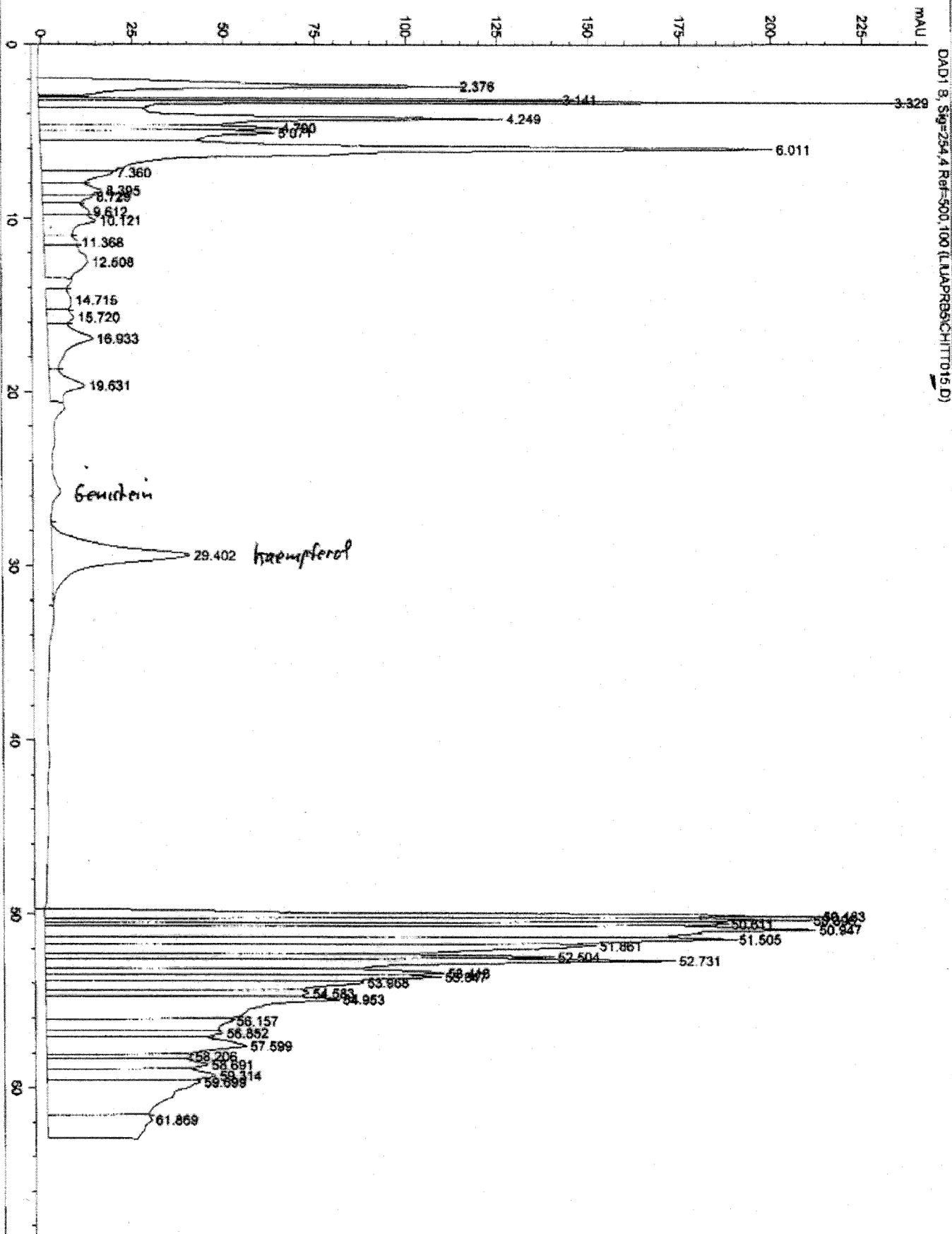
dry down

dissolved in 250 µl methanol (feller 2001) shot 30 µl

4-15 harvesting the seeds of 301, 304

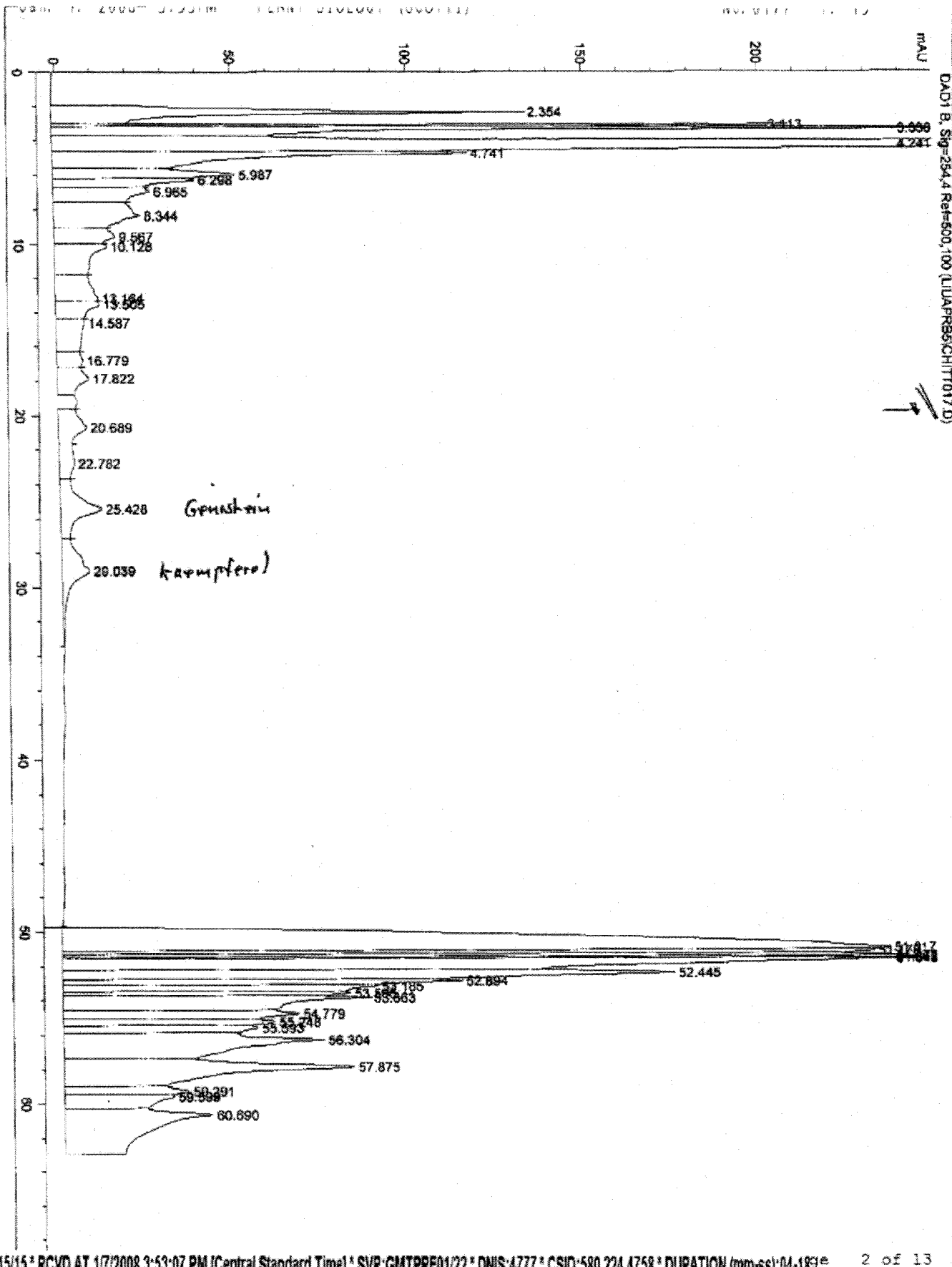
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Chy
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Chang-Jun Liu

1-29-08

Bettina Deavours

Date

Bettina Deavours

Response to July 30, 2007 Office Action, US 10/659,755

② Jan 7 2008 3:51PM PLANT BIOLOGY (SCOTT) No. 0177 P. 1 02

ATTN:

DATE:

Expenditure:

(3) Sterile of seeds of 9-2-1/8551 9-2-1/8551 9-8-1/8551 9-8-1/8551

8551/9-2-1 Sterile in ME (K⁺)

< be prepared for selection of loc/ctrl +6611/ctrl by spraying >

4-9: move these plates into 22°C greenhouse from 4°C



plasmid of ATCHS. ATCHJ F3'H DFR

TA Vector. were digested with EcoR

ATCHS Y. 2

ATCHJ 4

OK

F3'H #8

DFR #11

the plates may contain CORE site.

Choose #1, 2, 4, 7, 8, 10, 11

extract the plasmid from Cassia root (first started then to supp again: control 0.5g 0.5g Resupplied plasmid 0.5g

ctrl 2.5h 0.5g

2.5h 0.5g

ctrl 5.5h 0.5g

5.5h 0.5g

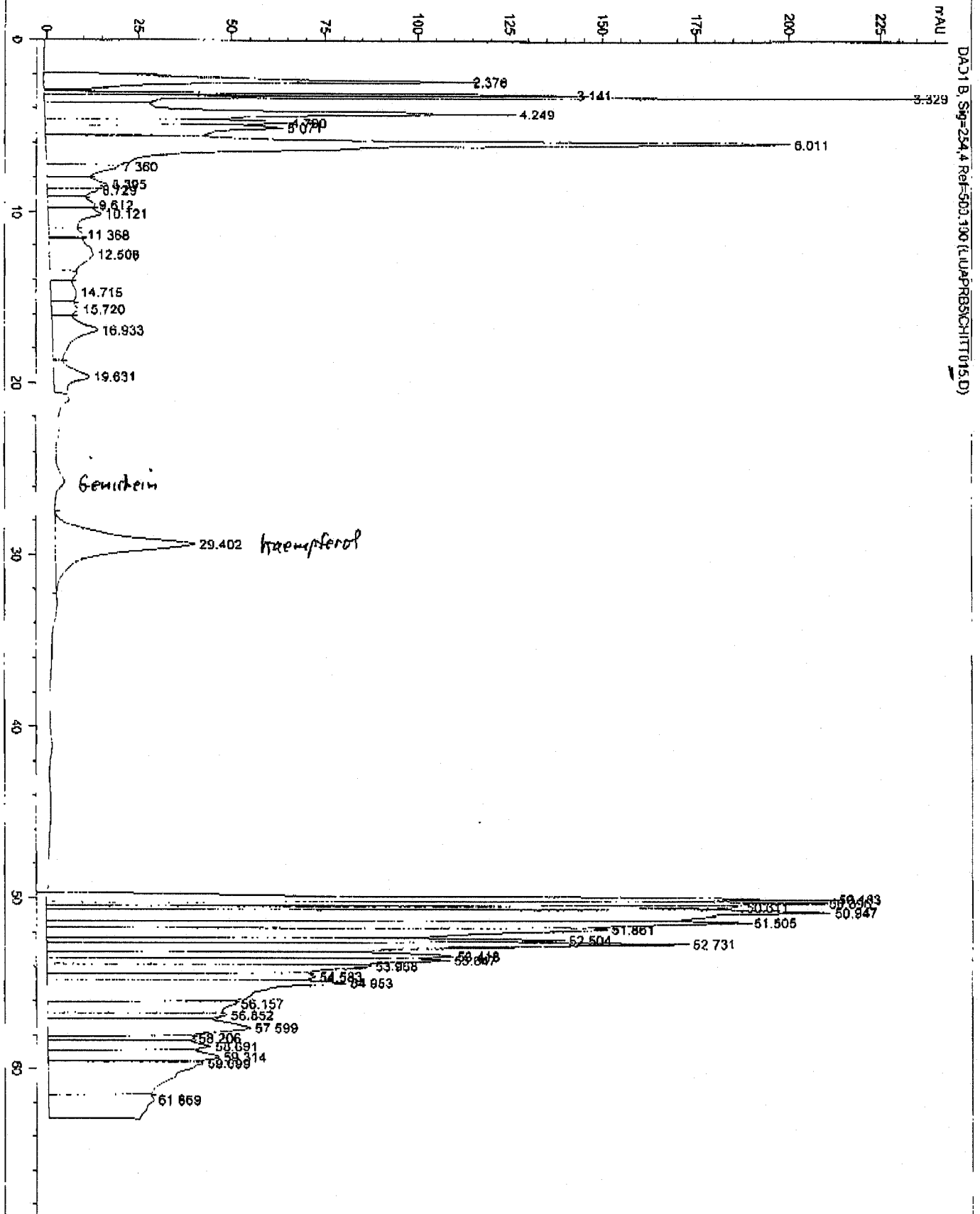
first with 100 µl of water. Sonicate for 1 min then overnight at 4°C

Suspend with acetone: 100 µl. for 2 hrs

dry down

dissolved in 50 µl water (full 50 µl)

4-5: harvesting the seeds of 301, 304



14

